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ORIGINAL ARTICLE

Efficacy of administering a sugar-free flavor before dental injections on pain perception in children: A split-mouth randomized crossover clinical trial

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Abstract

Background: Sweet taste administration before dental injections helps to control associated pain in children.

Aim: To evaluate the efficacy of using a sugar-free flavor on pain perception during dental injections.

Design: Children ($n = 84$) aged 4–9 (mean 6.71 ± 1.55) years who required buccal infiltration bilaterally participated in this split-mouth randomized crossover study. On the test side (flavor visit), infiltration injections were applied after receiving a sugar-free flavor. On the control side (no flavor visit), sterile water was administered. Demographic characteristics, body mass index (BMI), and sweet taste preference (STP) were recorded. Pain perception during injection was measured using heart rate (HR), sound, eyes, and motor (SEM) scale, and Wong–Baker Faces pain scale (WBFPS).

Results: Most children had healthy weight (72.6%) and equal STP (32.1%). In the test side, mean HR during injection, HR differences before and during injection, and SEM scores were significantly lower ($p < .001$, for all). There was no significant difference in the WBFPS between both visits. Flavor had a significant effect on pain reduction ($p = .001$ for HR, $p = .000$ for SEM), whereas age, gender, BMI, STP, and treatment side did not. Treatment sequence had a significant effect on total SEM scores ($p = .021$); children who received the flavor during their first visit had lower SEM scores.

Conclusion: Using a sugar-free flavor before dental injections helps in reducing associated pain in children.

KEYWORDS

children, flavor, injections, pain perception, randomized clinical trial, sugar-free

1 | INTRODUCTION

Effective pain control during a dental appointment is very imperative for successful behavior management. Poor pain control can make a child uncooperative, making dental treatment difficult.[1] Prevention and reduction in pain during treatment can nurture the relationship between the dentist and the patient, build trust, and enhance positive dental attitudes.[2] Interestingly, most complaints following oral local anesthetic (LA) injections were due to the anesthetic solution's bitter taste that leaked in the mouth.[3]

Since children with dental fear tend to miss appointments, and have higher caries levels and declining oral health, distraction is one of the basic techniques used to manage behavior. It is a technique by which the clinician diverts the child's attention from what may be perceived as an unpleasant stimulus. It can be attained by telling stories, audio, or visual effects, asking the patient to move a limb, or giving breaks.[2] Previous studies have demonstrated the effectiveness of various distraction techniques in alleviating pain during the administration of injections in children such as external cold and vibrating devices and 3D video glasses audiovisual distraction.[4–6]

Sweet taste administration prior to LA has been employed by one randomized clinical trial. It showed that administrating sucrose as a sweet solution in 8- to 10-year-old children prior to dental injections before the extraction of primary canines can help control associated pain. Interestingly, the efficacy of the sweet solution was influenced by the children's body mass index (BMI) and sweet taste preference (STP). A higher BMI was associated with a reduced analgesic effect, whereas a preference for sweet foods had a significantly positive effect on reducing pain levels.[7] One limitation was that both injections (study and control) were administered in a single dental visit, which can be challenging for young children to cope with. Considering this, delivering injections in two separate visits may offer children a more feasible and acceptable approach.

To date, no studies have explored the efficacy of sugar-free flavor solutions as a form of distraction in dental procedures in younger children. The flavors used in this study are natural flavors that are blended in a stabilizing base of vegetable glycerin or propylene glycol, both of which add a mild sweet taste. The flavors are sugar-free, gluten-free, nut-free, and of low carb. They are used in baked goods and sweet recipes. Therefore, the aim of this study was to evaluate the efficacy of using a sugar-free flavor as a sensory distraction technique during LA on pain perception in children aged 4–9 years compared with a negative control, using a split-mouth randomized crossover study design.

Why this paper is important to paediatric dentists

- This study is the first to show that prior administration of a sugar-free flavor as a distraction technique can reduce pain during dental injections in children aged 4–9 years.
- This technique has efficacy irrespective of the child's age, gender, body mass index, or sweet taste preference.
- By simultaneously activating the taste and olfactory senses, the use of flavors that are sugar-free, simple to use, and affordable may encourage paediatric dentists to use this distraction approach during injections for children.

2 | MATERIALS AND METHODS

2.1 | Ethics approval

Ethics approval was obtained from Jordan University of Science and Technology (JUST; Ref.: 1/147/2022). After explaining the objectives of the study, written informed consent was obtained from parents for their children to participate (trial registration: ClinicalTrials.gov Identifier: NCT05727527).

2.2 | Trial design

This was a split-mouth single-blinded randomized clinical trial, with 1:1 allocation ratio. Children were divided into two groups based on age. The initial treatment (flavor vs. sterile water) and treatment side (right vs. left) were randomized. So, within each age group, children were assigned according to initial treatment; first visit would be carried out with flavor versus sterile water, and then, based on which side they would receive treatment during their first visit (right vs. left).

2.3 | Study participants

2.3.1 | Eligibility criteria for participants

Children who met the inclusion criteria were invited to participate. These included healthy (ASA Grade-1) children, aged 4–9 years, who have not received LA in 2 years, with bilaterally carious maxillary primary first or second molars (ICDAS 3–5) requiring restorative treatment (therefore need bilateral maxillary infiltration). No pain, or if present, is short, less intense, provoked, and resolves within seconds or immediately after the removal of stimulus/analgesic (indicative of reversible pulpitis).[8] Exclusion criteria included children who had systemic diseases, mental, cognitive, and intellectual disabilities; uncooperative children who could not be treated under LA; previous unpleasant dental experiences as reported in records or by parents; need for pharmacological management to cooperate; and history of irreversible pulpitis or previous dental infection (abscess, redness, and fistula) at the injection site, and requiring tooth extraction.

2.3.2 | Setting

Patients were selected from those attending postgraduate paediatric dentistry clinics at JUST. Patients underwent eligibility assessment by a postgraduate student in paediatric dentistry (RB), trained by an experienced professor in paediatric dentistry (OA).

2.4 | Data collection

All clinical examinations were carried out by a single examiner (RB), and a trained dental assistant recorded data. Each eligible child was interviewed, and clinical and radiographic examination (two bitewings) performed to record: demographics, BMI, and STP.

STP was determined using the modified forced-choice procedure to query children directly about their food likes/dislikes.[9] It was translated into Arabic, then pilot-tested on 20 patients twice, with 10 children each time, to ensure the understanding of items. Children were presented with pictures of two side-by-side identical figures (figures corresponding to sex and race of the child) with neutral facial expression. They were told that children in the picture look the same, but they like different things. Five pairs of food were recited, one sweet and one salty, and the child was told that one of the figures liked one food, whereas the other figure liked another one. The child was asked to point to the figure that was most like her/him. The pairs, recited in counterbalanced order, included different food items. One pair had a sweet taste (ice cream, cookies, pancakes, candy, and dessert), whereas the other was salty (chips, pretzels, bacon, Doritos, and salty snacks). The child was also told that one figure likes adding sugar to their cereal, whereas the other does not. The scores ranged from 0 to 6, giving a point each time they chose the sweet option. A score of 6 indicates that the child always selected sweet foods.[7,9]

There were two stages of piloting. In Stage 1, we decided which flavor to use, and what technique to use. There were four flavors available: tutti frutti and cotton candy LorAnn flavors, as well as raspberry lemonade and peach SweetLeaf water drops. The tutti frutti flavor was eliminated due to the alcohol ingredient. So, the remaining three flavors were initially tested on 20 children who were not involved in the study. A topical anesthetic (20% Benzocaine; Gelato, Keystone Industries®, Gibbstown, NJ, USA) was applied at the injection site for 1 min. The children were then instructed to rinse their mouth to eliminate residual taste. We tried two techniques, chosen at random: smelling the flavor before applying it on the tongue or not. Infiltration injection was administered immediately after the flavor was applied, and 15 of the 20 children liked the flavor regardless of its type. The children reacted more positively when they smelled the flavor before applying it. Finally, we decided not to use the SweetLeaf water drops since they contained stevia, and we did not intend to use a sweetener/sugar substitute. So, the cotton candy LorAnn flavor was used for the remainder of the study. In Stage 2, the cotton candy flavor was tested alone on 20 more children. This time, all children smelled the flavor before application, and all reported a positive response to the flavor.

2.5 | Clinical intervention

All patients were treated by the same operator (RB). The initial procedure with the topical anesthetic was explained to the child using the same explanation, regardless of whether a flavor or sterile water was to be applied, using the tell-show-do technique and the tell-do technique for the injection part. Prior to injection, a 20% benzocaine topical gel (Gelato; Keystone Industries®) was applied for 1 min on dried mucosa at the site of injection (buccal mucosa of the molar), and a cotton roll was kept in the sulcus to prevent leakage of saliva and after-taste in the mouth. Then, the children were asked to rinse once. Afterward, one drop of flavor was dispensed from the bottle and applied to the tongue using a cotton tip (Q-tip); in the control visit, sterile water was applied in a similar way. Finally, a single carpule (1.8 mL) of 2% lidocaine with 1:80 000 epinephrine (Septodont, Saint-Maur-des-Fosses Cedex, France) was administered slowly and gradually using a 27-gauge 21-mm needle (Denject; Biodent Co. Ltd., 446-7 Noijo-Ri Jori-Eup, Paju-city, Gyeonggi-do, Korea) preceded by aspiration to prevent intravascular delivery and adverse reactions. The time interval between both visits (flavor vs. no flavor) was 4–6 weeks.

As the operator explained the procedure and gave LA, an observer (research assistant who was trained, calibrated, and blinded to the solution used) recorded the child's pain perception using pulse rate and the sound, eyes, and motor (SEM) scale. The children were requested to report their pain level using the Wong–Baker FACES Pain Rating Scale (WBFPS) right after the injection.

2.6 | Outcomes

2.6.1 | Pain assessment tools

Pulse rate/heart rate (HR) was recorded using a fingertip pulse oximeter and was used as an objective evaluation of pain. The pulse oximeter (IMDK, Shenzhen IMDK Medical Technology Co. Ltd., Guangming District, Shenzhen, China) was placed on the child's index finger

before applying the topical anesthetic. The first pulse rate was recorded before administrating the LA agent, and a second reading was recorded during the injection, taking the highest reading. The SEM scale was used as another objective pain evaluation during LA injection (Table 1). Each parameter has a 0–3 score. The score can range from 0 to 9, with 9 indicating the highest level of discomfort.[10]

The WBFPS was used as a subjective evaluation of child-reported pain. Following the injection, the research assistant displayed the scale. The children pointed to the face that best represented how painful they thought the procedure was. The scale has six different facial expressions, and scores can range from 0 to 10, with 10 indicating the highest level of discomfort.[11]

2.7 | Sample size

The sample size was calculated using a power analysis on a two-sample comparison of proportions of behavior: one group with sugar-free flavoring distraction and one negative control group. The inclusion of 38 patients in each group (total 76 sample size) would be sufficient to detect a statistically significant difference between interventions at a significance level of 5% with a power of 90, based on Al-Khotani et al.,[12] and to detect a true effect when present, we raised the power to 90% (whereas Al-Khotani et al. used 80%). We enrolled at least 40 in each group to account for any patient losses.

2.8 | Randomization, sequence generation, and allocation

Block randomization was utilized. We had two age groups: Group 1 (4–6 years) and Group 2 (7–9 years); each group was randomly allocated into two equal subgroups: study (to initially receive LA after applying a flavor, followed by sterile water in the next visit) or control (to initially receive LA after applying sterile water, followed by the flavor in the next visit). Afterward, they were randomly assigned to those who received the first treatment on either the right or the left side.

Block sizes of 4 were utilized. Within each block, a total of four participants were present, with a randomized allocation method determining distribution. Specifically, two participants were randomly assigned to the control group, whereas the other two were assigned to the test group. Subsequently, by employing a second table, two individuals from each block were further randomly allocated to undergo the initial treatment on the right side, whereas the remaining two were allocated to receive the first treatment on the left side. The randomization and allocation were performed by an individual not involved in the study. The CONSORT flow chart of patient recruitment, randomization, and allocation to groups is shown in Figure 1.

2.9 | Blinding

The subjects and operator could not be blinded to the flavors or control (water) because of its smell and taste. The research assistant was blinded to record outcome variables without knowledge of subjects' allocation.

2.10 | Statistical analysis

Data were analyzed using Statistical Package for Social Sciences v28.0 (IBM Corp., Chicago, IL, USA). A paired *t*-test and the Wilcoxon signed-rank test were used to determine any significant differences between groups. The *p*-values were calculated for the pulse rate before, during,

TABLE 1 SEM scale used to measure comfort or pain (Wright et al.[10]).

Comfort or pain level				
Observations: (1) Comfort (2) Mild Discomfort (3) Moderately painful (4) Painful				
Sounds	No sounds, indicating pain	Nonspecific sounds, possible pain indication	Specific verbal complaints, for example, "OW," raises voice	Verbal complaint, indicating intense pain, for example, scream, sobbing
Eyes	No eye signs of discomfort	Eyes wide, show of concern, and no tears	Watery eyes and eyes flinching	Crying and tears running down face
Motor	Hands relaxed; no apparent body tenseness	Hands show some distress or tension; grasps chair due to discomfort, muscular tension	Random movement of arms or body without aggressive intention of physical contact, grimace, and twitch	Movement of hands to make aggressive physical contact, for example, punching, pulling head away

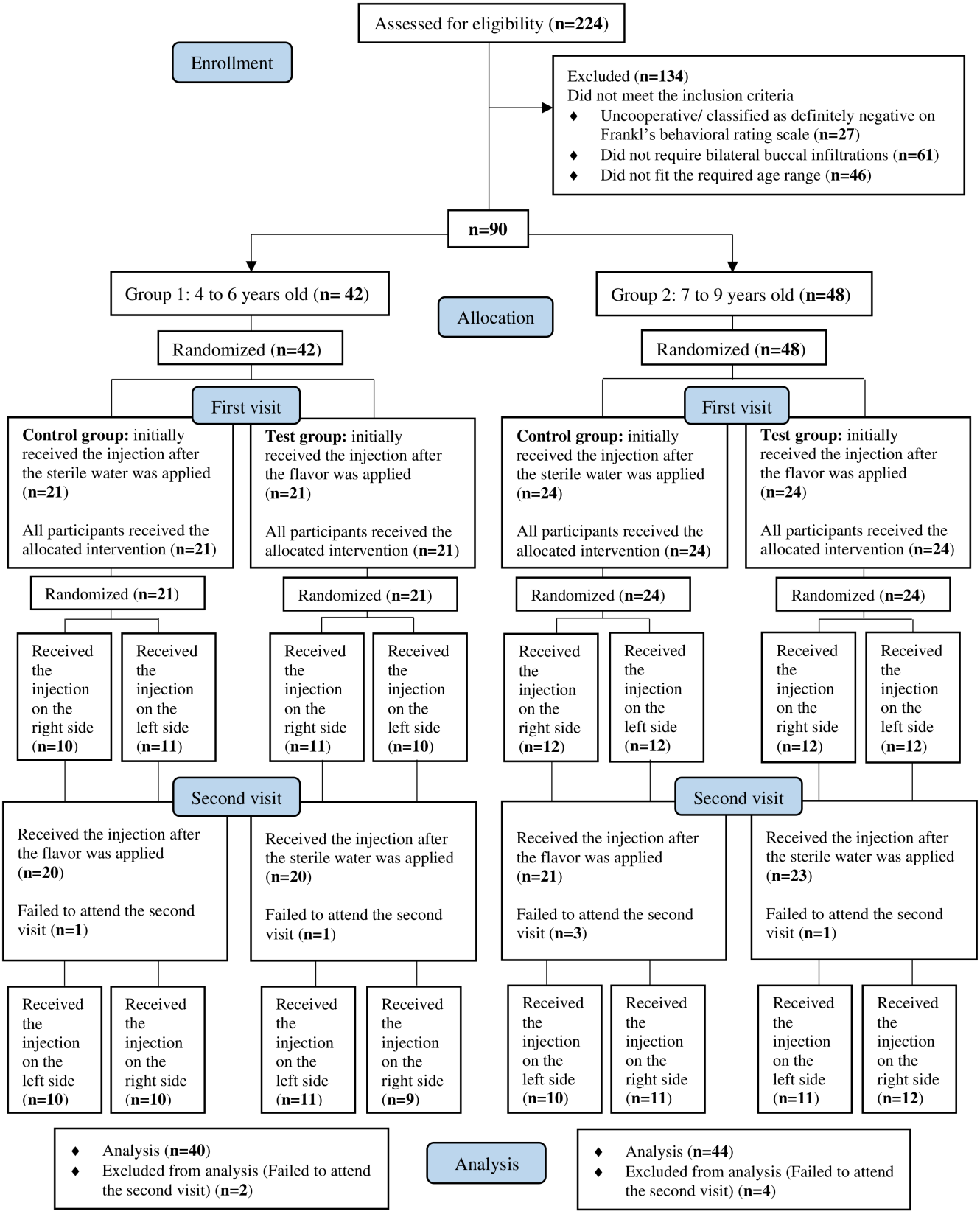

FIGURE 1 CONSORT flowchart of patient recruitment, randomization, and allocation to groups.

and difference between both visits using the paired sample *t*-test. The *p*-values for the sound, eyes, motor, total SEM score, and WBFPS were calculated using the Wilcoxon signed-rank test. Mixed-model regression analysis for the

whole sample utilizing pulse rate and SEM as dependent variables, and age, gender (male vs female), BMI, flavor (flavor used: yes vs. no), side of treatment (left vs. right), sequence of treatment (first visit: flavor vs. no flavor), and taste preference as independent variables, was conducted to determine whether the study parameters significantly influenced the reduction in pain following the administration of the sugar-free flavor. Age, gender, BMI, flavor, side, and sequence of treatment were used as fixed effects, whereas STP was utilized as a random effect. The significance level was set at 5%.

3 | RESULTS

3.1 | Participant flow, recruitment, baseline data, and numbers analyzed

A total of 224 children were invited to participate in the study, and 134 of 224 were excluded due to not meeting the inclusion criteria. Of the remaining 90 children who met the inclusion criteria, 42 were included in the first age group (4–6 years old), and 48 in the second age group (7–9 years old). Later, six patients were excluded from both groups because they failed to attend their second visit (Figure 1). Among the remaining 84 of 90 participants, there were a total of 43 male participants (51.2%) and 41 female participants (48.8%). The mean age was 6.71 ± 1.55 years. Most children (72.62%) had healthy weight, and equal preferences for sweet and salty foods (32.1%). Table 2 shows the descriptive statistics of age, BMI, and STP.

TABLE 2 Descriptive statistics of age, body mass index (BMI) and sweet taste preferences (STP) for included subjects.

Variable		Frequency (%)
Age	4 years	6 (7.1)
	5 years	15 (17.9)
	6 years	19 (22.6)
	7 years	16 (19.0)
	8 years	13 (15.5)
	9 years	15 (17.9)
BMI[a]	Underweight	7 (8.33%)
	Healthy weight	61 (72.62%)
	Overweight	10 (11.90%)
	Obese	6 (7.14%)
STP Score[b]	0	3 (3.6)
	1	4 (4.8)
	2	18 (21.4)
	3	27 (32.1)
	4	22 (26.2)
	5	7 (8.3)
	6	3 (3.6)
Total (*n*)		84 (100%)

Abbreviation: BMI, body mass index.

[a]BMI was calculated using the CDC BMI-for-age growth charts, which are based on a national survey (Kuczmarski et al., 2002).[30] Underweight: BMI less than the 5th percentile. Healthy weight: BMI between the 5th and 85th percentile. Overweight: BMI in the 85th to less than the 95th percentile. Obesity: BMI at or above the 95th percentile.

[b]STP (sweet taste preference) score was based on the modified forced-choice procedure by Pepino and Mennella.[9]

3.2 | Outcomes

In Group 1 (4–6 years old), the mean HR during the injection was significantly lower in the flavor visit ($p < .001$). The before and during injection HR mean difference in the flavor visit was significantly smaller than the no-flavor visit ($p = .001$). A statistically significant difference was observed for the sound ($p = .005$), eyes ($p < .001$), motor ($p = .003$), and total SEM score ($p < .001$) with all values being lower during the flavor visit. There was no significant difference in the means of the WBFPS between the two visits (Table 3).

In Group 2 (7–9 years old), there was a similar trend in all outcomes as in Group 1; the mean HR during the injection was significantly lower in the flavor visit ($p = .010$). As in Group 1, the before and during injection HR mean difference was significantly less in the flavor vs no-flavor visit ($p < .001$). A statistically significant difference was evident in the sound ($p = 0.010$), eyes ($p = .002$), motor ($p = .002$), and total SEM score ($p < .001$) with all values being lower during the flavor visit. Conversely, there were no significant differences in the WBFPS between the two visits. When considering the whole sample, results followed the same trend as described before for both groups (Table 3).

Mixed-model regression analysis for the whole sample utilizing pulse rate and SEM as dependent variables revealed that flavor had a significant effect on pain reduction ($p = .001$ and .000, respectively). Age, gender, BMI, STP, and side of treatment had no effect on pain reduction ($p > .05$). The sequence of treatment was found to have a significant effect on the total SEM scores ($p = .021$); children who received the flavor during their first visit had lower SEM scores.

4 | DISCUSSION

Managing dental pain is crucial in providing quality dental care for children.[2] LA is recognized as one of the most fear-inducing aspects of the visit,[13] leading 24.7% of parents to

TABLE 3 Comparison between the pain scales mean values during test and control visits, sound, eyes, and motor scale, and Wong–Baker FACES pain rating scale for Group 1 (4–6 years old), Group 2 (7–9 years old), and the whole sample, total ($n = 84$).

	4–6 years old ($n = 40$)			7–9 years old ($n = 44$)			Whole sample $N = 84$		
	Without flavor Mean ± SD	With flavor Mean ± SD	*p*-Value	Without flavor Mean ± SD	With flavor Mean ± SD	*p*-Value	Without flavor Mean ± SD	With flavor Mean ± SD	*p*-Value
Objective pain scale									
Pulse rate before	104.78 ± 17.61	102.15 ± 18.15	.068	100.14 ± 16.71	98.89 ± 14.80	.633	102.35 ± 17.20	100.44 ± 16.46	.210
Pulse rate during	111.88 ± 20.54	104.73 ± 18.95	<.001	111.30 ± 21.18	103.07 ± 18.87	.010	111.57 ± 20.75	103.86 ± 18.81	<.001
Pulse rate difference	7.10 ± 11.86	2.58 ± 8.59	.001	11.16 ± 12.96	4.18 ± 10.99	<.001	9.23 ± 12.54	3.42 ± 9.89	<.001
Sound (S)	1.25 ± 1.06	0.85 ± 0.83	.005	1.18 ± 1.00	0.77 ± 0.71	.010	1.21 ± 1.02	0.81 ± 0.77	<.001
Eyes (E)	1.23 ± 1.00	0.78 ± 0.77	<.001	1.11 ± 0.84	0.68 ± 0.80	.002	1.17 ± 0.92	0.73 ± 0.78	<.001
Motor (M)	0.98 ± 0.92	0.48 ± 0.68	.003	0.95 ± 0.94	0.55 ± 0.76	.002	0.96 ± 0.92	0.51 ± 0.72	<.001
Total SEM score	3.45 ± 2.65	2.10 ± 1.81	<.001	3.25 ± 2.34	2.00 ± 1.92	<.001	3.35 ± 2.48	2.05 ± 1.86	<.001
Subjective pain scale									
WBFPS	2.20 ± 3.00	1.80 ± 3.23	.114	3.05 ± 3.75	2.82 ± 3.69	.352	2.64 ± 3.42	2.33 ± 3.50	.073

Note: *p*-Values were calculated for the pulse rate before, during, and difference between both visits using the paired sample *t*-test. The *p*-values for the sound, eyes, motor, total SEM score, and WBFPS were calculated using the Wilcoxon signed-rank test. Significance was set at $p \leq .05$.

accept dental treatment under general anesthesia with its potential risks as a final resolution.[14] Employing an effective distraction technique might help with pain related to LA. The rationale of this study was to introduce a new sensory distraction technique that involves stimulation of both olfactory and gustatory sensations to control associated pain during LA through administering cost-effective, sugar-free flavors since dentists strive to adopt sugar-free practices to promote oral health.

This study evaluated the efficacy of a sugar-free solution on pain reduction during infiltration injections for younger children. The oral administration of a sucrose solution to control pain has only recently been evaluated on older children (8–10 years).[7] Although studies reported the efficacy of sucrose in reducing pain during immunizations for children,[15,16] it was found that using non-sucrose sweet-tasting solutions can be effective in reducing pain prior to infants' heel-stab blood sampling.[17,18] Congruous to the previous findings,[7] we found that using a sugar-free flavor can be effective in controlling pain associated with LA.

In this trial, a split-mouth randomized crossover study design was implemented, in which each patient acted as their own control. This design offers advantages by eliminating intersubject variability from group comparisons and minimizing the effect of covariates.[19] A drawback, however, is the potential occurrence of a carry-across effect, in which the intervention effect may spill over to the other side.[20] To mitigate this, two separate visits, with a minimum interval of 4 weeks, were scheduled for both techniques. This aimed to minimize the impact of pain experienced during the first needle injection on pain score of the second injection. Block randomization was used to ensure that each participant was randomly assigned to treatment sequences while maintaining relatively equal group sizes.[21] The age range we included (4–9 years) is the main age group that attends our clinic for restorative treatment. Despite the wide age range, we separated the participants into two age groups (4–6 and 7–9) for statistical analysis. A previous systematic review showed that distraction techniques have been tested on children aged 4–12.[22]

The results of this study demonstrated that the flavor had a significant effect on objective measures of pain, whereas subjective pain assessment remained unaffected in both groups. Notably, the children exhibited a comparatively lower rise in HR during the LA administration with the flavor. Heart rate has been used as an objective measure of pain in most studies assessing the effectiveness of distraction on controlling injection-related pain.[4–6,23,24] The SEM scale was also used as an objective pain scale to assess the patient's pain level.[10] The total SEM score and its components were significantly lower during the flavor visit, indicating an improvement in children's behavior.

Using the flavors prior to LA, pain reduction is suggested to be caused by a gustatory mechanism. The sucrose was found to only influence pain reaction when administered intraorally, but not intra-gastrically.[17] Sweet tastes may have analgesic properties due to the presence of afferent signals from the mouth rather than gastric or metabolic changes.[9] Therefore, the flavor was applied with a cotton swab (Q-tip) onto the dorsum of the tongue.

Based on a systematic review, it has been observed that children exhibit a preference for face scales compared with other self-report measures. Specifically, the WBFPS was the preferred choice among children of various age groups.[25] We found no significant difference in the WBFPS during both visits. Younger children may confuse pain with other feelings such as anxiety[26]; they might have pointed to the face that described their emotional state rather than how painful they thought the procedure was. Alternatively, older children may have underreported their pain experience to look better.[23]

The children were asked to smell the flavor prior to its application; this was adopted following the piloting stage as children exhibited a more positive reaction to the flavor when it was accompanied by olfactory stimulation. Furthermore, employing distractors that involve multiple sensory modalities may enhance effectiveness.[27] Consequently, a combined approach involving both taste and olfactory distractions was implemented. There is a close relationship between olfactory and limbic systems, and the limbic system has been linked to mood changes.[28]

The results revealed that BMI and STP had no effect on pain experienced during LA. This contradicts previous studies reporting that children with a higher sweet preference exhibited higher pain tolerance.[7,9] This could be attributed to the fact that most of the children had healthy weight and did not have a preference for either sweet or salty foods. On the contrary, children who received the flavor during the first visit reported significantly lower total SEM scores. This could be related to the possibility that reducing pain during treatment may contribute to fostering a more positive attitude during future visits.[2]

One of the limitations of this study is the type of injection; we only evaluated infiltration injections, as inferior alveolar block injections may be less tolerated by children.[29] Also, it would have been ideal to have a negative control group, in which no intervention was made (no flavorless placebo or experimental taste); this would have eliminated any chance of distraction made by the placebo itself. In conclusion, the findings of this randomized clinical trial show that administering a sugar-free flavor helps in reducing associated pain in children aged 4–9 years during infiltration injections. We recommend pharmaceutical companies to investigate incorporating sugar-free sweeteners in topical LA. Further research is needed on

other types of injections, such as inferior alveolar block and palatal infiltration injections.

AUTHOR CONTRIBUTIONS

OA and MA conceived the idea. OA designed the study and drafted the manuscript. RB collected the data. OA led the writing. RB and MA approved the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no potential conflicts of interest with regard to the authorship and/or publication of this article.

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